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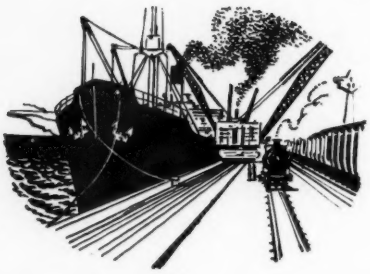
180 million dollars



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U.S. Foreign Aid Under the Microscope

U.S. FOREIGN aid programmes have been the subject of comment in these columns on several recent occasions and mainly in two contexts. First, the effect that they have had in channelling back to American manufacturers orders for mining machinery and equipment on terms which precluded effective competition from British manufacturers, and second, the longer-term effect that such economic penetration by aid with strings was likely to exert on the destination of raw material supplies from the aid countries under the conditions of mineral shortage which must re-emerge if present expectations regarding population trends are fulfilled. (Present indications are for an increase of one-third in world population over the next twenty years.)

In this context, we have urged the need for policies in the Commonwealth which would offset the influence of U.S. foreign aid—policies which would not only depend on competitive bidding by way of greater British investment in the underdeveloped areas, desirable though this may be. First we have urged the need for making better use of existing investment by British and international agencies by achieving a closer liaison between those in government who are concerned with signing the foreign aid cheque (or stimulating some other institution to do so) and those mining consultants and mining machinery manufacturers, who between them command the British technical know-how and industrial productive capacity, which ought to be (but so often are not) made available, side by side with the financial aid, if not actually as a condition of it.

We have also repeatedly stressed the need for a unified Commonwealth mineral resources policy, if only as a basis for correlating these resources with the prospective growth in world mineral demand so as to identify those minerals in which the Commonwealth is likely to become deficient or which, due to the financial or political conditions under which they are being worked, are in danger of pre-emption by industrial powers outside the Commonwealth.

In considering Britain's own lack of foresight in these respects, we should not, however, fail to learn from the difficulties which the United States has herself been experiencing in the operation of her vast foreign aid programmes, which from this side of the Atlantic have appeared so challenging to Britain's influence in the underdeveloped countries.

Despite the considerable opposition in Congress to the Administration's plans for maintaining U.S. foreign aid in 1959/60 at substantially the same level as now, there seems little doubt that this aid will continue on a substantial scale for three good reasons:—first, cold-war strategy; second, the stimulus to American manufacturing exports which at the same time greatly minimizes the real dollar cost of the aid; third, the reflection of one facet of a quite widely held view in Washington that money, or for that matter surplus farm products, spent *now* on the acquisition of metals for the stockpile (or on the acquisition of control over the destination of eventual mineral production) is in the very long term certain to be both intrinsically profitable and conducive to market stability as metal prices rise under the pressure of growing demand.

On the other hand, there is currently considerable soul-searching in Washington as to how effectively American foreign aid is being spent. In this connection a Presidential advisory committee on world economic practices, which was set up last year to consider counter measures to Iron Curtain economic penetration, has recently produced a report which, judging by comment in the American Press, is a most realistic document.

The first point of interest is that the report regards foreign aid as a stop-gap operation which, it is hoped, will not be a permanent feature of the American economy and stresses that the best hope for economic progress in the underdeveloped areas is the growth in them of a free enterprise system. This is an admirable sentiment, but experience to date suggests that the stop-gap period is likely to be indefinitely prolonged. Moreover, the report appears to recognize, at least implicitly, that a lot of American aid has been dissipated in the past in consequence of the receiving country having failed to utilize it effectively. In years gone by this has also been the experience of the World Bank and it is significant that nowadays the World Bank is insisting on the receiving country retaining competent consultants to supervise any project on which it advances capital, and, indeed, is tending to make the repayment of each instalment of the loan conditional on a satisfactory technical report.

The report also appears to have expressed some concern about the possible effect of foreign aid expenditure on the United States' economy. In this connection the rate at which gold continues to flow out of the U.S. and the rate at which inflationary trends continue within, both reflect the influence of foreign aid spending.

Finally, and perhaps in British eyes a little surprisingly, the report is critical of red tape and delays in foreign aid administration which are stated to have produced negative political and economic results from what would otherwise have been desirable activities. In part, this is stated to be due to division of foreign aid responsibility as between a number of government departments.

By way of constructive recommendations, the report urges that the U.S. Government should not intervene with foreign aid except where private enterprise, either from the States or from some other Free World country, is unwilling to undertake the risk. Moreover, where government does intervene on a foreign aid project, the report urges that private enterprise should be utilized wherever possible in giving effect to the project, and similarly that private enterprise should, wherever possible, be developed in the receiving country by making the aid funds available to foreign private interests rather than to foreign governments.

The report also recognizes the disincentive to private investment inherent in the situation existing in many of the underdeveloped areas by recommending that earnings from foreign operations be exempt from tax at least until the income is brought back into the States and even then that tax should be at a preferentially lower rate.

This last recommendation is one which must surely be looked at with a particularly jaundiced eye by the British manufacturer who has long suffered from various forms of subsidy (including tax exemptions) on exports from other Western countries.

The lessons of all this for Britain appear to be two. First, the report is a reminder of the tremendous amount of energy which is being put into American foreign aid programmes. Secondly, while the spirit of self-criticism, which appears to be pervading Washington at the moment, may possibly lead to a somewhat reduced scale of foreign aid in the future, it may at the same time also lead to the more effective application of the aid which is forthcoming. Let us in Britain and in the other Commonwealth countries learn what we may from American experience so that we derive maximum advantage from such aid as we are now providing and which we must inevitably provide in the future on an increasing scale, even at the cost of retarding the rate of advance in our own standard of living.

GROWING INTEREST IN GOLD

World production of gold (excluding the U.S.S.R.) increased by some 800,000 oz. in 1958 to about 30,200,000 oz. Latest estimates of Soviet production, which in 1957 was put close to that of South Afica, suggest that it was running at about the same level in 1958.

The year saw a marked decrease of turnover in most gold markets, state Samuel Montagu and Co. Ltd. in their "Annual Bullion Review, 1958". They estimate that turnover in the London market decreased by some 25 per cent, owing mainly to the decrease in Central Bank activity.

Sales of gold by the U.S.S.R. were not on the same scale as in 1957, but about 6,000,000 oz. were sold. The greater part of the sales was transacted through Switzerland, though much of the gold found its way to London.

Samuel Montagu estimate that of the total of about 36,100,000 oz. of new gold sold in 1958, some 18,000,000 oz. went into Central Bank reserves, about 5,000,000 into industrial consumption, and 4,000,000 into normal hoarding channels. The balance of 8,000,000 oz. was bought in Switzerland, London, or Canada for investment by individuals, institutions, and even some foreign government bodies. This compares with a corresponding figure of about 1,500,000 oz. in 1957.

The highest price for gold in 1958 at the daily "fixing" was 250s. 11d. on July 18 and the lowest, 248s. 8½d., on January 22—a range of about ⅞ per cent. The highest price for gold quoted in London against U.S. dollars at the time of the daily "fixings" was $35.13-$35.15 per oz. in the first half of October, and the lowest $34.98-$35.0 during the early days of January—a range of under ½ per cent.

A most unwelcome feature of the London market last year, states the review, was the complete absence of the types of Central Bank operations which had been so prominent a factor in previous years, namely, gold buying by Central Banks to fund that portion of debit balances due for repayment at the monthly settlements of the European Payments Union. The high level of quotations for gold against U.S. dollars ruling throughout the year made it impossible at any time to buy gold in the market at under $35 per oz., the rate at which the Union credited payments tendered in gold. Hopes that this factor might reappear in the present year were finally dashed by the automatic termination of E.P.U. following the "convertibility" declarations by most of its member countries.

To some extent the loss of this type of Central Bank business was offset during 1958 by the tendency of Central Banks to switch dollar holdings into gold. This resulted in quite substantial buying orders being executed in London, but it was not enough to make up for the loss of E.P.U. business. As a result, there was an appreciable decline in Central Bank activity. The total turnover in London fell, it is estimated, by about 25 per cent in 1958 from that of 1957.

Although the world's private hoarding demand again fell away last year (the review places it at about 4,000,000 oz. of fresh production gold in 1958 against about 7,500,000 oz. in 1957), investment in gold by individuals, institutions, and even some foreign government bodies rose sharply. It

is estimated that these transactions increased from about 1,500,000 oz. in 1957 to about 8,000,000 oz. last year.

This growing interest in gold was closely connected with the discussion which continued throughout most of the year about the possibility of a higher dollar price for gold. The review points out that in most discussions and publications two basic reasons were given why gold should be revalued in terms of the U.S. dollar. The first was related to the so-called world liquidity crisis, the argument being that in the period during which the dollar price had remained unchanged at $35 per oz., world trade had expanded sharply. An increase in the price of gold, it was contended, would help to relieve the pressure on individual countries' gold reserves. The second reason put forward for changing the gold price was closely related to the business recession in the U.S. It was urged that this revaluation would provide a sharp stimulus to the American economy. Both these arguments found little favour in the U.S. itself.

While the pressure for a higher gold price on these two grounds will be stoutly resisted by the American authorities, that does not necessarily rule out the possibility that the dollar price of gold might be raised for external reasons. Though not foreseeing a loss of confidence in the dollar in foreign financial circles in the immediate future, Samuel Montagu do not exclude the possibility that a further decline in dollar holdings caused by the American Government's difficulties in handling their financial problems might well force the hands of the American authorities.

The American gold stock stands at present at about $20,500,000,000, of which some $11,900,000,000 is needed as legal backing for the Federal Reserve Banks' note and deposit liabilities. But some $8,600,000,000 of short-term dollar assets are held by foreign governments and Central Banks, and if these were to be converted into gold, because of a loss of confidence in the dollar, the situation would begin to look quite different. Moreover, private firms and individuals abroad also have short-term dollar assets worth some $6,000,000,000 (excluding several thousand million dollars' worth of marketable securities), which could in certain circumstances be liquidated and the proceeds converted by Central Banks into gold.

This is citing the extreme possibility, but if something like it happened, the further possibility of an embargo on gold sales could hardly be overlooked. Such an action would certainly lead to an immediate and substantial rise in the dollar price of gold outside the United States.

THE FOURTH STRIP MILL

Despite the recession in the steel industry there has never been enough steel strip to fully satisfy a rapidly expanding home and export demand. The need for additional capacity has long been recognized, but a capital investment previously estimated at £160,000,000 to £180,000,000 is not to be lightly undertaken and the consultations between the government and the sponsors of the project to build a fourth strip mill have extended over a period of several years.

Final decisions have now been reached. The original idea was that Richard Thomas and Baldwins, the one major steel company which has not yet been "de-nationalized", should build a fully continuous mill at Newport with an annual capacity of about 1,000,000 tons of steel and strip. Under governmental pressure the scheme has now been abandoned.

It is not seriously disputed that from an economic standpoint the Newport site was most desirable but other considerations supervened. The argument ultimately accepted by the government under political pressure, was that the siting of the strip mill should be determined not wholly by considerations of economic efficiency but as part of a policy of providing more employment throughout the stricken areas.

For this reason, the decision reached last November was that instead of one big unit, there should be two smaller mills, one built by Colvilles in Scotland and the other by R.T.B. in Wales. The advantages of a fully continuous mill have been sacrificed on the altar of political and sociological expediency.

From the details of the two projects which have now been disclosed, it transpires that both mills will be of the semi-continuous type. The Scottish mill will have a designed capacity of 500,000 tons and that of the R.T.B. mill will be 600,000 tons, though it is envisaged that the ultimate output of the Newport works may be raised to a round 1,000,000 tons.

A common feature of both enterprises is that they will be largely financed by the government through the medium of the Iron and Steel Holding and Realization Agency (I.S.H.R.A.). Colvilles have been promised a loan of £50,000,000 and a further £60,000,000 will be provided for the Newport project in ten tranches over a five-year period beginning in October next. I.S.H.R.A. thus becomes the predominant feature in both enterprises. It is, in fact, a compromise between full-scale nationalization as advocated by Her Majesty's Opposition and the retention of the control of the industry under private ownership. The companies bear the financial risk under the watchful eyes of the government which provides the bulk of the capital.

How the new alliance will work out in practice, time alone will determine. Construction work is expected to begin almost immediately, but the plant will not be ready for partial operation until 1963 at the earliest and may not be in full production until 1965 or 1966. Meanwhile, the point is stressed that the privately-owned steel companies, undeterred by the slump, are pressing on with their development plans involving a further capital outlay of £600,000,000. These plans have not been substantially modified although attainment of the target figure of an ingot capacity of 28,000,000 tons in 1963, may be delayed for another year.

The essential fact is that British steel marches on.

INCENTIVES FOR MOROCCAN MINING

Several incentives for the mining industry have been announced by the Ministry of Economy, Morocco, notably the granting of cheaper power and a considerable reduction in *ad valorem* taxes on certain mineral products. The principal aim of the measures is to make Moroccan mineral prices more competitive.

The Ministry of Economy's order announces that electric energy used by mines will be reduced by 2 frs. per kWh.; coal used in concentrating or smelting ores will be reduced by up to 2,000 frs. a ton, and fuel oil used for the same purpose will be reduced by between 1,000 and 1,500 frs. a ton. Furthermore, the order announces a 30 per cent reduction in the price of diesel oil used in electricity generating plants at mines which are not connected to the State electricity network.

With effect from January 1, 1959, the 5 per cent *ad valorem* export tax on lead, zinc, cobalt, and manganese ores or concentrates is reduced to 0.5 per cent on a maximum of 6,000 tons of ores or concentrates exported by each mine.

Advances in Aerial Survey Techniques

AERIAL exploration of remote or faceless areas of the earth now can be done at a fraction of the time and cost of older methods. Radan, a new radar Doppler aid to navigation produced by General Precision Laboratory Inc., guides the survey plane over any type of land topography or water without ground stations.

Canadian Aero Service Ltd. estimates that Doppler navigation cuts survey time by 40 per cent. It reduces total survey costs by 50 per cent or more, compared with other radio-guided surveys. It permits air surveys over areas previously considered too difficult.

Since the magnetic data is required at a very early stage in the exploration programme, the employment of Radan navigation permits the making of the magnetic survey prior to, or simultaneously with, the mapping programme rather than after the usual delay for the completion of aerial photography.

The Radan System

The Radan navigation system installed in Aero's DC-3 earlier this year was designed and manufactured by General Precision Laboratory Inc., United States. The basic instrument is a commercial version of the military navigational systems produced by GPL. Aero's Radan navigation equipment includes a course and distance computer, a Kearfott J-4 compass, and a special precision computer to guide and track the aircraft on its aerial survey missions.

The Radan system requires no ground stations. It provides a continuous and highly accurate measurement of the aircraft's position. Maps or photos are not required. Surveys can be made over any terrain.

The Radan navigator directs four columns or pencils of radiation downward from the aircraft. Two are transmitted fore, and two aft. They create a pattern on the ground in which each of the pencils would arrive at the end of an X-shaped pattern.

The Doppler return, or echo, frequency shifts from the two diagonal pairs of pencils are compared. If the frequencies differ, then the antenna is not aligned with the actual path being flown and a side wind is causing the aircraft to drift. This frequency difference actuates a servomechanism which rotates the antenna so its axis is aligned with the path of the aircraft and the difference signal is reduced to zero. By comparing the angle of the antenna array and the centre line of the aircraft, a direct reading of the drift is obtained. Its accuracy is one-tenth of one degree.

With the antenna aligned with the path on the ground beneath the aircraft, the signals from the forward pencils are compared with the signals from the aft-looking pair. The frequency shift between these two pairs (after computations to correct the effect of the radar beams' slanting path) can then be converted into a direct indication of ground speed. In most cases, the ground distance can be measured with an accuracy of 1 part in 1,000 or better.

Roughness of terrain causes no errors in the Doppler signal. Frequency shifts alone—not the length of the path to the ground—affect the readings of the radar device. The Radan navigator provides drift angle and ground speed. A compass indicates the deviation of the centre line of the aircraft from magnetic north.

In the computer used for aerial survey guidance, the track angle being made is compared with a track angle set into the computer. The difference between the angle being made and the angle desired is presented to the pilot in the form of an indication to right or left, on a meter dial. This meter guides the pilot's continuous choice of direction during a flight. Deviations are noted and accumulated by the computer, so that the off-course error is continuously presented, both visually and on a record tape. By observance of the off-course error and representation of this error on a second cockpit dial, the accumulation of errors can be kept virtually to zero. Thus the survey aircraft can be guided with great exactness upon a pre-determined straight line on the earth's surface.

Most airborne geophysical surveys or photographic sorties require flying a grid of parallel lines, so that the coverage of the earth's surface will be systematic. The Radan system's computer is so constructed that at the end of a flight line, a signal is given to the pilot that the line is completed. Then a button can be pressed so Radan navigator guidance will next be provided to the pilot for executing a turn into the succeeding line, which will be offset by a pre-set distance. When the pilot completes his turn, he again follows his Pilot Direction Indicator and settles down precisely on the new line, parallel to the first line and offset by the desired distance. This sequence is followed many times until the survey is completed.

Since most surveys are far too large to complete in a single day, the Radan navigator serves an additional use: to guide the aircraft from its base to the survey area. This cancels any necessity to seek and search for the beginnings of the lines for the survey project of the day.

Advantages of Radan

One of the great advantages of Radan navigation is that terrain differences make virtually no difference. Surveys can be made over sand, ice, tundra, forest, and hills, with equal ease. Water bodies are the only exceptions. Glass-smooth water, by failing to diffuse reflections of the radar signal, may cause the signal to fail temporarily, causing the device to go on memory circuit. This is not a problem, for the memory circuit is quite exact. However, information derived from moving sea water may be affected so that the accuracy of results is considerably lowered compared with surveys over ground terrain or fixed ice.

Radan's economic importance is presented as equally great in quality of survey results and economy of compilation. The fact that lines flown are straight and that the intervals on the lines are exact, means that compilation of the magnetic data can proceed far faster than by the visual comparison of photographs required in most geophysical surveys. Furthermore, the dependability of the Radan navigator results will mean that the accuracy of maps derived from Radan-navigated flights will be better than that which can be achieved in visually controlled flights.

A dramatic application of Radan navigation will be made in air magnetic reconnaissance surveying where isolated lines are required over unmapped areas. Heretofore, a heavy price in dependability of position and quality of result has been paid because of navigational uncertainties. With Radan, reconnaissance lines over totally unexplored country are claimed as dependable and of as high an order of technical excellence as lines flown in a well-mapped country. Radan guidance is stated to cost between $1 and $2 per line mile.

Vares—Yugoslavia's Biggest Iron Ore Mine

By Branko Djukic

AN important milestone in Yugoslavia's mining history was reached not long ago, when celebrations were held at Vares, Bosnia, and Hercegovina, to mark the completion of the programme of capital construction at the largest iron ore mine in Middle Europe.

Since the days of the Romans, this part of Yugoslavia has been renowned for its great riches of iron ore, but in the Middle Ages, and later under the Turks, these resources were very inefficiently exploited. The first commercial production of ores from Vares began immediately after the occupation of Bosnia and Hercegovina by Austria-Hungary, about seventy years ago, but for more than half a century development of this mine was extremely slow. At the outbreak of the first world war production amounted only to some 200,000 tonnes of iron ore, which was extracted manually and by very primitive methods.

After the second world war development was speeded up to quite a remarkable extent. This change was brought about by the expansion of the Yugoslav steel industry, which gave a new importance to the national resources of iron ore. Attention was directed in particular to the famous Ljubija mine in Bosnia and Hercegovina, where the known reserves were large enough to justify a substantial programme of capital investment, and the Vares mine, which had huge reserves with an average iron content of 35 p.c.

Work on the expansion of the Vares mine was started in 1951. About 22,000,000,000 dinars have been invested in the programme of extensions and modernization, of which some 6,000,000,000 dinars have been spent on mechanization alone. It is noteworthy that orders approximating 3,500,000,000 dinars were placed with domestic factories, compared with a total expenditure of only 2,000,000,000 dinars on imported equipment; a comparison which indicates the significant progress made by the Yugoslav machinery manufacturing industry since the war. A further 4,000,000,000 dinars were expended on the construction of a normal gauge railway track from Vares to Podlugovi, which has speeded up the transportation of iron ore, while the construction of dwelling houses, communal buildings, and other amenities accounted for about 1,500,000,000 dinars.

As a result of this programme of investment, the output of iron ore at Vares has been raised to 1,000,000 tonnes annually and now accounts for about 65 per cent of Yugoslavia's entire production. It is anticipated that in the current year production will amount to 1,400,000 tonnes and in 1960 it will reach some 1,750,000 tonnes—more than double the pre-war output. Since proved reserves are now estimated at 150,000,000 tonnes, the possibility that in 1961 production may be further increased cannot be excluded.

Parallel with the development of the mine, the ironworks which is an associated enterprise, has also been expanded. During the second world war, the Zenica ironworks was totally destroyed, but thanks to the voluntary exertions of workers it was very quickly reconstructed after the war. Last year its production amounted to about 70,000 tonnes of pig iron, some 7 per cent of Yugoslav output.

Substantial financial investments are anticipated during the coming years for the further expansion of the Zenica ironworks, the target being an annual output of 90,000 tonnes of pig iron, which is in line with immediate needs.

THE MINERAL WEALTH OF GUINEA—III.

The Bauxite Ore Wealth

FOR a long time geologists have said that bauxite deposits capable of commercial exploitation existed on the Los archipelago, a few miles south-west of Conakry. Bow-shaped Kassa and Tamara, the two main islands, are three and a half miles long and a half to one mile wide. Something of a geological curiosity, they both contain a certain number of rare minerals, most remarkable of which is vuilliaumite, a crystallized sodium mineral not occurring anywhere else in the world. The substratum here is nephelinitic syenite.

The lateritic alteration of this host rock, rich in alumina and poor in iron, has given birth to the local bauxite orebodies. The alumina concentration has been brought about by the more or less complete elimination of the iron oxide.

In 1933, France's Société des Bauxites du Midi secured the concessions over the Los deposits. But it held them in reserve because, in the pre-war era, France boasted sufficient bauxite resources at home, a surplus even being available for export to Switzerland. Moreover, the insular location of the ores required relatively big financial outlays to develop them. Nearly everything would have to be built up from scratch: power plant, workshops, housing for staff, loading pier, and a hospital.

Los Ores Go to Canada

Since the cost of a kWh in Canada runs to only one-third of a farthing—against nearly a halfpenny in France—it is easy to appreciate why this country has become a major producer of aluminium, although she has little bauxite ore resources herself. One local venture, Aluminium Laboratories Ltd., advanced the funds for the exploitation of the Guinean deposits, to be repaid in kind in the form of ore shipments.

All bauxite ores on the Los group are not uniformly capable of economic treatment in the Canadian refineries. A high-grade ore must not only carry a high amount of alumina, but also not too much silica and iron impurities. The allowable percentages of such depend on the price of electric power in the processing country.

Commercial Orebodies

Only local orebodies assaying more than 50 per cent alumina and less than 10 per cent silica are considered as commercial propositions. On Kassa island, the six worked deposits aggregate 5,000,000 tonnes of proven reserves. On average, the local ore carries 54 per cent Al_2O_3, 11 per cent F_2O_3, 6 per cent SiO_2, and 28 per cent H_2O.

On Tamara island, the proved reserves aggregate 4,000,000 tonnes of a slightly higher grade ore from eight deposits. The proportion of ore to barren ground works out at around four. The thickness of the local orebodies may vary anything up to 33 ft. On an average these extend 11 ft. in depth on Kassa and 12 ft. on Tamara.

Bauxite ore is found in Europe (originally in the neighbourhood of the village of Les Baux, in Provence, hence its name) in the form of aluminium monohydrate (Al_2O_3, H_2O) mixed with the trihydrate (Al_2O_3, $3H_2O$), whereas the Guinea material is the trihydrate. However, it has been found that extraction of alumina, and thence aluminium,

The hydroelectric plant at Grandes Chutes caters for the electric current supply to Conakry, capital and main harbour of Guinea

# of Guinea

By Maurice Moyal

(Editor of "Petroleum Mirror", the monthly newsletter of the French petroleum industry.)

Distribution tower to the furnace and warehouse at the plant on Kassa Island

from the Guinea deposits is quite as easy as from the European occurrences.

It is noteworthy that at the contact of the syenite, a layer of clay, light in colour and somewhat resembling kaolin, is often encountered. The laterite itself must have been very argillaceous at one stage of its formation, as shown by the clay intercalations found mostly at the bottom of the orebodies. Blocks of bauxite are frequently encountered side by side with beds of lateritic clays.

The deposits outcrop in some places, while in others a layer of topsoil overlies them. Extraction is quite simple. All that is required is to remove the vegetation and topsoil with a bulldozer, and extract the rose-coloured rock with steam shovels. The only difficulties accrue from the tropical rains and the fact that the St. Lawrence river, which ore carriers must sail up to the Canadian refineries, is icebound in winter time.

Shipment to Canada

Since winter in Canada corresponds to the height of the mining season here, warehouse facilities have had to be provided for some 250,000 tonnes of ores, or about half of the total yearly production. A special dock, 800 ft. long and 50 ft. wide, has been built at Kassa for loading the ships. Aluminium Laboratories have supplied mining technicians as well as top funds. The following are the tonnages the Canadian venture has received in return:

Tonnes	*Year*
442,150	1954
493,000	1955
452,000	1956
385,000	1957

The ore can be shipped in crude form to the Canadian refineries, but to save costly freight charges a beneficiation plant has been built on Kassa. Here the rock is broken up and placed on vibration tables, where a stream of water passes over it causing the heavier silicon and iron oxide impurities to settle. It is dried in a fuel-oil heated rotating furnace, 150 ft. long and 10 ft. across. The ore is loaded on to ocean-going ships by means of a conveyor belt. With automatic loading equipment, vessels of 10,000 tons deadweight can be loaded in six and a half hours or even less.

The Cogon Deposits

The Los deposits are being exploited mainly because of their favourable geographical location. But their known reserves fade into insignificance when compared to the tremendous potentialities that other Guinean deposits have to offer. Difficulty of access and high freight rates have been thwarting their development.

For example, in 1948 the geologists of the Société des Bauxites du Midi discovered far more promising orebodies 50 miles north-east of the town of Boké, in northern Guinea. These high-grade ores, containing a negligible amount of silica, have been found to extend over an area along the plateau about 1,800 ft. above the Cogon river valley.

The local deposits occur in barren plateau known here as "bowés", which are overlain by a thick crust of laterite. The bauxite ore comes in the shape of huge blocks embedded in a sort of ferruginous cement, and is the result of the alteration of primary schists. Extensive researches and sample drilling have established the existence in the area of no less than ten orebodies capable of commercial exploitation. The Société des Bauxites du Midi has been awarded the concessions.

Aluminium Laboratories have been devoting well over £3,500,000 to their development. The money is going into the construction of a special 70-mile railway from the site of the deposits to the mouth of the Rio Nunez river, where will be provided a pier capable of loading all types of ore carriers to the tune of 1,000,000 tonnes of bauxite a year. The first shipment is to be made in 1960.

Huge Aluminium Projects for Guinea?

In 1950, other deposits were unearthed ten miles from the town of Kindia, itself located some 45 miles from the Atlantic Ocean. Here again the local ores are characterized by an almost total lack of silica, but they sometimes carry a high iron-oxide content. Extensive reconnaissance and drilling have established that the reserves are so huge as to supply for scores of years an aluminium plant with a 200,000-ton yearly production capacity.

The orebodies have the rare good fortune to lie close to the upper reaches of the Konkouré. Thus the future plant will rely on the power generated by a dam at Souapiti, impounding the head waters of that mighty torrent. Another dam will be provided at mid-stream Amaria. Between them they will have an estimated yearly capacity of 1,000,000 kW.

(To be continued)

Machinery and Equipment

Wide Range of Crushers

A wide range of crushing equipment is now being manufactured and marketed in this country by Babbitless Co. (Great Britain) Ltd.

The Babbitless gyratory crusher does not employ babbit, or anti-friction, metal for its bearings; the complete mechanism relies on roller bearings throughout. The mechanism of the crusher is said to consume little lubricant, only a small addition of grease being necessary every three months. High rotational speeds are possible, and this, together with a small degree of eccentricity, is claimed to result in high capacity for any given size of machine as well as a more satisfactory cubical product.

All unnecessary friction is reported to have been suppressed, and as a result no cooling system for the lubricant is necessary, thus simplifying considerably the installation of the plant. In consequence, the horse-power per ton of material produced is stated to be relatively small and the saving on power costs considerable. The mechanism of the Babbitless crusher is stated to be dust- and water-proof, and it has been designed to withstand the arduous operating conditions encountered in the mineral extractive industries.

These crushers are manufactured in two types—primary, secondary or fine, and a wide range of sizes in these types is available to meet various requirements as to capacity or product size. The primary crushers range from the BP3 with a capacity of 6-9 t.p.h, to the BP84 with a capacity of 3,300-5,500 t.p.h. The secondary crushers range from the BS502 at 3-4 t.p.h. to the BS515 at 280-330 t.p.h. The primary units each have two openings, scaling from 2¾ in. x 14 in. to 84 in. x 252 in. and producing a fineness from ¾ in. to 10 in. Speed of eccentric varies from 650 r.p.m. to 115 r.p.m. The necessary h.p./hr. is from 7-9 to 400-500. The secondary models each have two openings, scaling from 2 in. x 12 in. to 14½ in. x 57 in., and producing a fineness from $\frac{3}{16}$ in. to 2 in. Speed of eccentric varies from 650 r.p.m. to 330 r.p.m. The necessary h.p./hr. is from 7-9 to 75-100.

This type of machine is widely used for crushing ferrous and non-ferrous ores, slag, limestone, etc., when these materials are reasonably dry and non-colloidal.

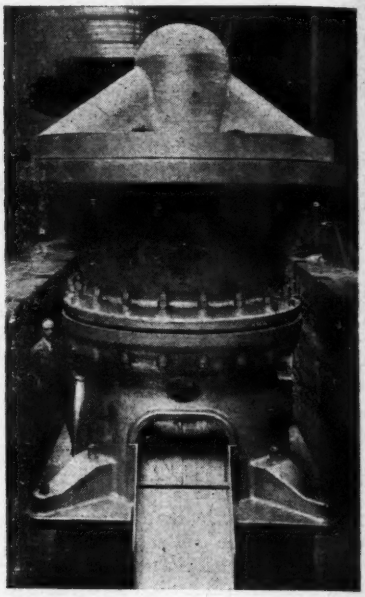
In the extra heavy-duty double-roll crusher, with manganese steel shells of a special design, both shells have standard teeth and longer teeth, or sluggers. The latter nip and shear the larger lumps and force them down into the machine, whilst the former complete the crushing process, a double crushing action is thus achieved which combines impact and compression.

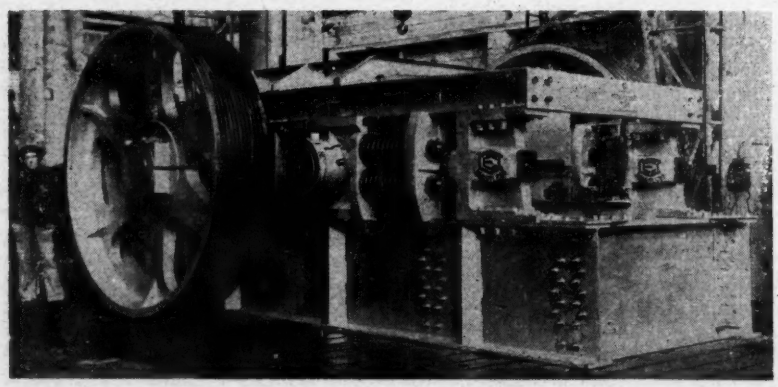
The makers claim the machine is able to withstand the most arduous operating conditions. The rolls are individually driven at the same speed, while the bearings of each roll are mounted on a nest of very strong springs which enable an emergency opening of the rolls when large pieces of tramp iron or any uncrushable material passes through the crusher. Adjustment of the rolls is simple, and the machines are grease lubricated by means of a central system synchronized with the main drive.

A very low wear of the shells is claimed to be experienced, and a crusher of this type has crushed to date 14,000,000 tons of Lorraine iron ore without replacement of any wearing parts, and even after this the performance of the crusher is maintained. A very important feature of this type of slugger roll crusher is that it can be fed with run-of-mine ores, i.e. without any scalping arrangement.

Although these machines are mainly used for a primary duty, the teeth arrangement on the shells can be modified to suit a secondary duty. This type of machine is recommended on sticky ores, limestone, gypsum, marl, bauxite, or the clayey overburden found in opencast mining.

Rolls range from 36 in. dia. to 98 in. dia., width feed from 36 in. to 84 in., and feed openings from 42 in. x 38 in. to 94 in. x 88 in. Minimum capacity at 6 in. setting is 320 t.p.h. to 3,000 t.p.h.





Above is the BP 38 Babbitless primary gyratory crusher, and below, the BCS 54 double-slugger roll crusher

The British company is associated with CEI-Babbitless, France, and whilst it is responsible for manufacturing and distribution throughout the Commonwealth, the French organization covers the rest of the world. In Canada, distribution is made through Babbitless Canada Ltd. In addition to Great Britain, Babbitless machinery is also manufactured in France, Germany, and Spain.

EXTENSIBLE SAFETY LADDERS

The new extensible safety ladder, for which patents are pending, recently evolved in tubular steel by Tubewrights, has many industrial uses and applications. These ladders are made in any lengths in multiples of 1 ft. The standard length is 20 ft., weighing 1 cwt. The maximum length for practical purposes is 100 ft. Each rung is supported by galvanized steel wire ropes which are fixed to eyelets threaded over the rungs. The breaking strain of each rope is 1½ tons, and as there are four ropes, the ladder could carry 5 tons. But for practical purposes the makers suggest 8 cwt. as a maximum working load for a 20 ft. section, providing a safety factor of ten. The psychological effect of climbing *inside* the ladder creates a sense of safety. These extensible ladders have obvious applications in mining.

TRANSMISSION FOR LOADMASTERS

The Chaseside Loadmaster loading shovels are now available with fully automatic transmission and torque converter. The installation of this transmission reduces the number of foot controls to two, brake and accelerator, and the gear lever is replaced by a forward and reverse shift lever. This simplification of controls reduces the time taken for a full operating cycle, as well as reducing operator fatigue. The torque converter proportions the power to meet the load conditions and reduces shock loads to the engine and transmission.

MINING MISCELLANY

A small wolfram mine in Cornwall was put up for auction yesterday. The mine is Hawkswood, near Launceston, on the eastern escarpment of Bodmin Moor. It was opened during the last war by an American mining engineer who died before first operations were completed. The mine, which can be run by about eight men, stretches 2,000 ft. into the hillside, and was offered on the premises with buildings, plant, and the residue of the lease, on the instructions of the liquidator of Pena Industries Ltd.

★

Methane Pioneer, a vessel jointly owned by the Gas Council of Great Britain, and the Constock Liquid Methane Co. of America, having successfully discharged her first experimental cargo of liquid natural gas into shore tanks installed by the North Thames Gas Board at Canvey Island, is now on her way back to the Gulf of Mexico to collect a further cargo.

★

Pay increases for all African staff were granted on Tuesday by the copper mining companies in Northern Rhodesia. They take effect from February 1, 1959, and range from 5s. to 30s. on both the minimum and maximum rates. Both parties have agreed not to seek to vary pay levels for the next two years except in the event of a major economic upheaval.

★

A party of Norwegian scientists recently left Alta, Norway, with electrical equipment for the detection of copper deposits on the desolate Finnmarksvidda. Rich deposits have been located in an area some 85 kilometres south of Alta towards the Finnish frontier.

★

The Broken Hill Proprietary Co. is making intensive examination of iron ore deposits on the Cape York Peninsula and Northern Territory, Australia.

★

An iron-ore deposit claimed to be of excellent quality has been discovered near Nienburg, Lower Saxony. State geologists say they believe the Fe content to be 42 to 48 per cent. They estimate that the deposit contains up to 400,000,000 tons of ore at a depth of about 3,300 ft.

★

For the first time in the modern history of Northern Armenia, gold-bearing rocks have been discovered, and plans are being made for commercial exploitation of the deposits. Until now, gold has only been mined in this Soviet Republic as a by-product of other ores. Geologists have discovered traces of ancient mines dating back to the second century B.C.

★

Poland and Communist China have signed a 1959 trade and payments agreement providing for a turnover of 385,000,000 zlotys (about £5,830,000). Poland will deliver, this year, complete industrial plants and plant equipment, machine tools and machinery, locomotives, diesel engines, excavators, tractors, rolling-mill products, etc. She will import from China items including non-ferrous metals and minerals.

★

Hungary and Czechoslovakia are between them to build a power plant at Nagymaros, in Hungary, which, with a capacity of 120 to 130 mW. and an annual output of 800,000,000 kWh., will be used mainly for the aluminium producing industries of the two countries.

★

A new iron ore deposit has been found in the Sama region of Tacna Province, in Southern Peru. It is reported that a number of foreign companies are interested in working the deposit, which is said to be richer than the deposits at Acari and Marcona, and to contain between 76 per cent and 80 per cent of metallic iron.

★

New deposits of interest are reported to have been discovered in Czechoslovakia. There are sources of wolfram, in particular, which will be worked in the Krkonose Mountains region, while tin-wolfram and fluoridbarite have been found in the Krusne Mountains, West Bohemia. Prospecting teams are using the latest equipment, much of it of Soviet manufacture, to fill in the last "white spots" on the maps of the country's geological resources.

★

Mount Morgan Ltd. is examining the prospects of erecting an ammonium sulphate plant in Central Queensland, Australia. The proposed plant would cost about £A6,000,000 and would use 60,000 tons of Mount Morgan pyrite and 60,000 tons of Callide coal, the Callide coal deposit being situated south of Mount Morgan. Associated with the Mount Morgan company in the project are the Power and Gas Corporation of England, and the Chemical Construction Corporation of New York. The proposed plant would have a capacity of 100,000 tons of ammonium sulphate per year, to supply the demand of the Queensland sugar industry for 120,000 tons annually.

PERSONAL

Herr Alfried Krupp, owner of the Krupp steel and engineering concern of Essen, has left for Japan for talks with Japanese industrialists on co-operation in Asian markets. Herr Krupp is expected to stay in Japan for about five weeks, during which time he is to study economic and industrial conditions there.

★

The Institute of Metals (Platinum) Medal has been awarded to Dr. L. B. Pfeil, a director of the Mond Nickel Co. The Rosenhain Medal has been awarded by the Institute to Professor R. W. K. Honeycombe, Professor of Physical Metallurgy at the University of Sheffield. The W. H. A. Robertson Medal and Premium goes to Dr. R. B. Sims, chief engineer of the Davy and United Engineering Co.

Mr. P. J. L. Crokaert has been appointed a director of De Beers Consolidated Mines Ltd.

★

Lord Plowden, chairman of the Atomic Energy Authority since 1954, is to become chairman of British Aluminium and vice-chairman of Tube Investments, at the beginning of next year. Lord Plowden's term of office with the Atomic Energy Authority expires on December 31 next. Sir Ivan Stedeford, chairman of Tube Investments, is at present also chairman of British Aluminium.

★

The Seventh Annual Dinner of the Institution of Plant Engineers was held at the Connaught Rooms, London, recently. The principal guest speakers were Sir John Hacking, M.I.E.E., and Mr. J. E. Duckham, F.Inst.Pet.

CONTRACTS AND TENDERS

Taiwan (Formosa)

55,000 M/T Bauxite. Tender TEN 37950. Bids to the issuing authority, Central Trust of China, Purchasing Department, 68 Yen Ping Nan Lu, Taipei, Taiwan. Closing date, March 25, 1959. Ref. ESB/6294/59. Telephone inquiries to Chancery 4411, extension 738 or 771.

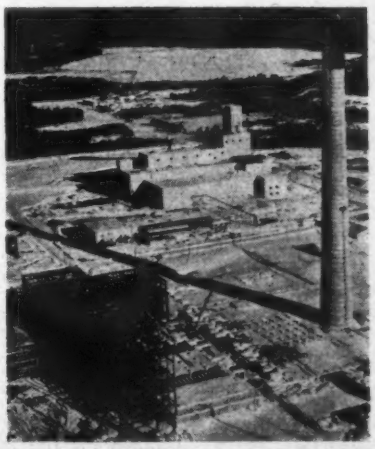
Spain

A quantity of nickel to the value of $446,000 f.o.b. Procurement authorization No. 52-695-99-PL-9207. Tender 9207-1. Bids to issuing authority, Consejo Ordenador de Minerales Especiales de Interes Militar, Genova 13, Madrid. Closing date, March 30, 1959. Ref. ESB/4428/59/I.C.A. Telephone inquiries to Chancery 4411, extension 354.

★

Martin, Black and Co. (Wire Ropes) Ltd., of Coatbridge, near Glasgow, have recently received two large dollar orders. One is for 14 miles of wire rope for bauxite ore handling in Trinidad.

Progress at International Nickel's new nickel mining project in Northern Manitoba is shown in the accompanying photograph from the company's annual report for 1958 issued on Tuesday. In the left foreground is the steelwork for the smelter. Between it and the 500-ft. stack are foundations for furnaces and converters. Immediately beyond the smelter is the compressor building, and then the mill, of which the mine production shaft headframe is an integral part. In the distance can be seen Thompson Lake



Metals and Minerals

The Future Demand for Sulphur and Pyrites

The pattern of the world supply of sulphur has changed considerably in the past two years, due to expanding production in Mexico and Canada. A position of threatened world shortage several years ago has given place to temporary over-supply and prices have been depressed.

Particularly encouraging in this difficult period for producers are the views of Mr. O. Herneryd, sales director of the Boliden Mining Co., as expressed in a lecture delivered to a conference at Boliden attended by representatives of Swedish consumers of pyrites and elemental sulphur.

The lecturer concerns himself only with native sulphur and pyrites, which cover approximately 86 per cent of the world's demand for sulphur. The production of native sulphur is largely concentrated in North America, while Europe and Japan dominate the production of pyrites. International trade in sulphur raw materials is almost entirely confined to the export of the surplus production of the United States and Mexico to other continents. The total export amounted in 1956 to 2,200,000 tonnes, of which 800,000 tonnes were shipped to Europe.

Europe's total consumption amounts to 5,800,000 tonnes annually, of which 59 per cent is derived from pyrites, 23 per cent from elemental sulphur, and the other 18 per cent from other sources. Only one-seventh of the whole demand for sulphur has to be imported, mainly as sulphur.

In discussing the long-term development of world consumption, Mr. Herneryd points out that as much as 80 to 85 per cent of the world's sulphur production is used in the manufacture of sulphuric acid. Since the 1880s, world production of sulphuric acid has increased almost rectilinearly, and the trend seems on an average to be about 4 per cent. If it is assumed that the tendency during the coming decades will follow this trend, the world consumption of sulphuric acid will be doubled in eighteen years. This is equal to an increase in the demand for sulphur of 16,000,000 tonnes. The growth of consumption during the past twenty years, however, has been greater than 4 per cent and has followed a trend of 5.6 per cent. If this rate of increase continues, consumption will be doubled in thirteen years. In leading producer circles in the United States, it is estimated that world consumption will be three times as great in twenty-five years, which is equivalent to an annual increase of about 4.7 per cent.

These figures seem high at first glance. If one considers the *per capita* sulphur consumption in the world, however, it will be found that at present it averages about 13 lb. The European consumption amounts to 44 lb. and the American to 77 lb. In Sweden, it is as high as 93 lb. Only a slight rise in the *per capita* consumption in under-developed countries would imply a great increase in the demand for sulphur and pyrites. One must also take into consideration the rise in the world's population, which experts calculate will be 450,000,000 during the coming decade. If such a great number of people are to be fed, the consumption of superphosphate must be increased enormously, and with it the supply of raw materials for sulphur. The growing production of uranium also requires increasing amounts of sulphuric acid. It is calculated that by 1959 more than 1,000,000 tonnes of sulphur in the form of sulphuric acid will be required to leach 30,000,000 tonnes of uranium ore.

Will it be possible to satisfy these enormous demands for sulphur raw materials? Already we can count on large new additions to production, the main sources being the purification of natural gas and petroleum. In Canada, for example, it is planned to attain a production of at least 1,000,000 tons of sulphur from natural gas by the beginning of the 1960s. France will recover sulphur from the natural gas field at Lacq, and it is estimated that by 1961 a capacity of 1,300,000 tonnes of sulphur will be reached. To satisfy the rising demand, however, the production of Frasch sulphur in the United States and Mexico must also be considerably augmented. The known deposits of Frasch sulphur, however, are relatively limited, being estimated at 150,000,000 to 200,000,000 tonnes. Many of the reserves are offshore and it will require enormous capital investments to work them. It is expected that running costs will be very high. If the deposits are to be profitably operated, the present price of sulphur is too low.

So far as the European supply is concerned, analysis indicates that, if consumption rises at the rate of 4 per cent, the whole of the rising Lacq production will be absorbed by the growing consumption, but only on condition that the import from America diminishes, and ceases in 1961. Up to 1975, however, a further 4,000,000 tonnes of sulphur will be required, and a greater consumption must, therefore, be covered by increased imports from America, or, which is more probable, by a higher consumption of European pyrites. If the trend of consumption follows the 5 per cent curve, however, the French production will be absorbed even if the imports of sulphur from America remain on the whole unchanged.

Europe's reserves of pyrites are very large. Moreover, it seems as if the manufacture of copper, lead, and zinc will be based more and more on sulphide ores poor in metal, which must be passed through a flotation process. During flotation, pyrites concentrates will always be obtained. It must be presumed, therefore, that production of flotation concentrates will increase. As regards price, pyrites have every possibility of asserting themselves. It is therefore probable that the future increase in consumption will be covered by pyrites, which will retain or increase their relatively great share in Europe's supply, provided that a suitable relation between sulphur and pyrites is effected. In this connection, it is noteworthy that the policy of the Boliden Co., which supplies about 99 per cent of Sweden's sulphur requirements, is to maintain the competitiveness of its pyrites in relation to elemental sulphur.

Since American production dominates the world market, and will do so for a very long time to come, it will be the American price that will decide the world level for sulphur. The Korean crisis led to an enormous demand for all kinds of goods, including sulphur. The lack of sulphur and the improved price situation after the Korean War provided the impulse to start the Mexican production and stimulated the opening of new deposits in the United States. The increase in output was too great and overproduction was aggravated by the American recession. This situation led to a great reduction of prices in the autumn of 1957, as a result of which the profits of the United States sulphur companies are now insufficient to allow prospecting for new deposits or investigation of new possibilities.

If the price of sulphur does not improve, these companies will be in an extremely weak position to meet the great rise in consumption, and the risk of a shortage by the 1960s is by no means out of the question. There seems good reason to presume that the price of American sulphur will soon reach the $28 level prevailing before the latest reduction. Still higher prices are possible as soon as the present slump is over.

ALUMINIUM PRODUCTION IN FRANCE

A programme designed to raise France's aluminium output from the present level of more than 160,000 tonnes annually to some 250,000 tonnes two or three years hence is being planned by the Péchiney-Ugine group. The additional output will be derived mainly from the new plant of 56,000-ton capacity, which is to be erected near Lacq and which will derive its electrical power from a station dependent on Lacq's natural gas.

Of the current French output, all but 20,000 tonnes from the Edea plant in the Cameroons is produced in the country. At present, Edea is supplied with alumina from overseas, but in about a year's time, when the plant being built by an international group at Fria is completed, alumina will become available from French Guinea. Edea will then be able to increase its output to 45,000 tonnes annually. Péchiney's share of the 480,000 tonnes of alumina to be produced at Fria will be 21 per cent.

France's domestic consumption of aluminium has risen in twenty years from 31,000 to 153,000 tonnes, doubling between 1953 and 1957. While it is not anticipated that this rate of progress can be maintained, encouraging prospects are seen in the export field, having regard to the opportunities presented by the Common Market and to the advantages conferred by the latest franc devaluation. Péchiney hopes to see its exports rise to 35 per cent of turnover during the current year.

★

The Norwegian producer, Mosjoen Aluminium A/S (MOSAL), which started operations a year ago, is now completing the installation of sixteen new furnaces, which will increase production capacity from 22,000 to 25,000 tonnes annually. There are further expansion plans for another thirty-two furnaces, which would bring capacity up to 30,000 to 32,000 tonnes a year. It is planned that this

second stage shall be finished simultaneously with the completion of the new Rossaga hydro-electric power station towards the end of 1961. Available resources of water power would make an eventual annual output of 70,000 tonnes possible.

*

A total of 1,182,166 l.tons of bauxite was shipped from British Guinea by the Demerara Bauxite Co. Ltd. in 1958, reports Barclays Bank D.C.O. This is a decrease of 52,167 tons when compared to total production for 1957.

QUICKSILVER HARDENS

The price of quicksilver for immediate delivery ex-warehouse London has hardened to £75 per flask, compared with £74 to £75 last week. However, the harder tone is considered to be indicative of the lack of offers, rather than to any pick-up in demand. Most dealers, in fact, report scant interest by the buyers. Arrivals of Mexican metal have seemingly been smaller than expected, but it is still possible to buy metal for forward shipment at about £70 to £71 per flask c.i.f. The general opinion is that the present tendency is unlikely to foreshadow a sustained upturn. There is no shortage of supplies generally and stocks in Italy are believed to be substantial, estimates ranging from 50,000 to 80,000 flasks. Spain and Italy continue to quote £80 per flask f.o.b.

BELGIAN TITANIUM COMPANY

Société Belge du Titane has been set up at Brussels with the co-operation of the National Lead Co., New York. The new firm has an initial capital of 500,000 Belgian francs, and will concern itself principally with the production and sale of titanium metal products and titanium-based chemicals.

CUBAN NICKEL

The Freeport Sulphur Co. states in its annual report that construction of facilities for the extraction of nickel and cobalt from Cuban ores proceeded through 1958 and are expected to be completed later this year. The report adds that progress was not seriously affected during the civil strife in Cuba, and the project has gone forward successfully under the new government.

U.K. ANTIMONY CONSUMPTION

Consumption of antimony metal and compounds (in terms of antimony metal) in the U.K. fell back slightly in December to 387 tons from 406 tons in November, according to the British Bureau of Non-Ferrous Metal Statistics. This brought total consumption for 1958 to 4,740 tons compared with 4,622 tons in 1957.

U.S. ASBESTOS DEPOSIT

Jefferson Lake Sulphur Co. plans to enter a mining field outside the sulphur industry for the first time. This New Orleans firm has signed an agreement with American Asbestos Mining Corporation of New York to explore for and develop asbestos deposits in Calaveras County, California, which are reported to have very favourable commercial prospects.

COPPER · TIN · LEAD · ZINC

(From Our London Metal Exchange Correspondent)

During the period under review, the copper price has moved more than for some time past, whilst the prices for the other three metals have remained reasonably steady. In general, the tone of the copper market is uncertain, whilst that for lead and zinc is reasonably steady. The early strength of the copper market can be attributed to fears of a strike in both the United States and Chile in July, and to the unsettled situation in Central Africa, which many people feel could give rise to serious dislocation of supplies.

L.M.E. "BACK" REFLECTS U.S. PRICE BOOSTS

The upward movement was halted by rumours that the United States Government might release copper from its stockpile and, although this was denied, it was admitted that under the Defence Production Act there was some 50,000 tons of metal which might be made available to industry for defence orders should the situation warrant it. It is generally felt, however, that the consumer buying is likely to continue, and the recession in the middle of the week is likely to be short-lived.

A backwardation on the London market has once more developed, and it seems probable that copper may begin to move from Europe to America in view of the price differential and the shortage of copper in the latter country. The backwardation developed in spite of a further rise in official stocks by 510 tons to a total of 8,577 tons.

In America, the customs smelters raised their intake price of No. 2 scrap to 28½ c. per lb., and after having been out of the market for some days started re-selling at 34 c. per lb. At the same time in Europe, the Belgian price was raised to the equivalent of slightly under 32 c. per lb. Antwerp or New York, duty unpaid. The firm undertone was also helped by the continuation of the strike at the Ray mine in Arizona, by the strike at the Hayden smelter, and later by a fresh strike at the smelter at Tacoma.

The U.S. Copper Institute's figures for February showed that although shipments to consumers exceeded those for January, stocks of refined copper in producers' hands rose by 4,743 s.tons to a total of 85,523 s.tons at the end of February. It should be noted that this is still less than three weeks' supply at present rates of offtake. Outside the United States, shipments were down when compared with those of January, and stocks of copper rose by 15,015 s.tons to a total of 218,780 s.tons. In addition, it is interesting to note that the daily average rate of production, both inside America and outside, were the highest for several years at 3,234 s.tons and 5,574 s.tons respectively.

A LITTLE BUFFER STOCK SELLING?

The tin market has been relatively stable, and it is believed that the buffer stock manager has been selling smaller tonnages of metal above the basis price of £780 per ton. A slight weakness in the market developed on rumours that this basis level might be reduced, but it is pointed out that this can only be done after a full council meeting, and that the next meeting of this body is not scheduled before May 26. Consumer demand has meanwhile remained satisfactory.

Shipments from Singapore during the first half of March total 64½ tons, and from Penang 1,645½ tons, both figures being slightly above the corresponding period during January. Stocks in official warehouses in the United Kingdom declined by a further 444 tons to a total of 11,738 tons, but in spite of this the contango remained practically unchanged. On Thursday morning, the Eastern price was equivalent to £822½ per ton c.i.f. Europe.

LEAD AND ZINC LOOK STEADY

The lead and zinc markets have remained featureless, with very little difference in the price level. The contango in lead and the backwardation in zinc remain practically unchanged. With consumption of both metals running normally, it is not expected that there will be any appreciable movement in the price level, but with more tonnage of lead becoming available to the market, the contango may increase. The labour trouble in Australia appears to be settled for the time being and work has been resumed at the Broken Hill South Mine.

Statistics issued show that pig lead production in O.E.E.C. countries in January showed a fall from that prevailing in December, the figures being 51,166 tonnes against 59,969 tonnes. The increase as compared with a year ago amounts to about 5 per cent. During 1958, the total production in O.E.E.C. countries amounted to 593,301 tonnes against 590,927 tonnes in 1957.

Zinc O.E.E.C. production in January amounted to 69,672 tonnes against 71,588 tonnes in December, and there is little change as compared with the year before. The total zinc production in 1958 amounted to 826,490 tonnes as compared with 840,402 tonnes in 1957. The percentage of high-grade zinc increased somewhat, as of the 1958 total 325,974 tonnes were of the higher grade, whereas in 1957 the figure was only 313,184 tonnes.

Closing prices were as follows:

	Mar. 12		Mar. 19	
	Buyers	*Sellers*	*Buyers*	*Sellers*
COPPER				
Cash	£250½	£251	£250½	£251
Three months ..	£250½	£250½	£248½	£248½
Settlement ..	£251		£251	
Week's turnover	11,100 tons		11,850 tons	
LEAD				
Current ½ month	£69½	£69½	£69½	£69½
Three months ..	£71½	£71½	£71	£71⅛
Week's turnover	10,250 tons		5,100 tons	
TIN				
Cash	£781¼	£782	£782	£783
Three months ..	£785	£785½	£786	£787
Settlement ..	£782		£783	
Week's turnover	1,230 tons		510 tons	
ZINC				
Current ½ month	£75⅛	£75½	£75⅛	£75½
Three months ..	£74½	£74½	£74½	£74½
Week's turnover	7,125 tons		5,825 tons	

London Metal and Ore Prices appear on inside back cover.

Mining Finance

Inco's Plus Qualities

Mr. J. F. Thompson, chairman of the International Nickel Company, can discuss the future of his metal with rare authority. Even quite large mining companies often produce only a small percentage of world output. Inco, on the other hand, produces by far the largest part of Free World nickel output.

This pre-eminence in the field of nickel tends to obscure the fact that Inco is also a major producer of copper, platinum, iron, cobalt, gold, and silver, to name only six of the thirteen by-product metals derived from the Sudbury ores. Inco has always appreciated the contribution that these metals could make to its prosperity, and its programme of research into possible applications has led to many important advances in the field of metal utilization. The most recent of these has been its development of ductile, or nodular, iron, one of the few raw materials for which demand in 1958 was higher than in earlier years. Nevertheless, it is nickel on which the prosperity of the company was founded, and with such developments as the vast new project at Thompson, Manitoba, nearing completion, it is nickel on which the future will be built. Indeed, it is the demand for nickel which determines the output of the by-product metals.

The 1958 financial year, however, marked a setback in Inco's progress, temporarily at least. It was, in fact, the first year in over a decade in which the company's various operations were working below capacity, and with the prices of other metals still declining, or at best merely beginning their recovery, Inco's earnings per share were at the lowest level since 1949. Moreover, the first major labour disturbance in the company's history stopped all production at the Ontario mines during the last three months of the year. At the same time, expenditure on the Manitoba project was reaching its climax, and other capital spending, such as that on Inco's high-powered research programme into new uses for nickel, was running at an extremely high rate.

With profits being squeezed so viciously, it is a measure of the solidity of the Inco structure that the storm was ridden out without retarding the tempo of the work at Thompson. Neither was there any curtailment either of exploration activities or of long-range development work at the Ontario mines, while the market development programme continued unabated. Obviously some sacrifice had to be made, but the reduction in dividends received by shareholders might well have been far more severe. Indeed the total amount distributed was at least equal to the total for any previous year except 1954-57.

The views of Mr. J. F. Thompson and Mr. H. S. Wingate (president of Inco) on the immediate future for nickel are optimistic. In their statement with the 1958 accounts, they say that the outlook is better than at any time since the downturn in 1957, and that by mid-February there were definite indications of an upturn. In the longer term, prospects depend on Inco being able to assure consumers, both existing and prospective, of a supply large enough not only to take care of "normal" demand increase, but also to absorb the surges in consumption which may occur from time to time. This, of course, is the reason for the emphasis placed on the speedy completion of the Thompson project, which will have a capacity of 75,000,000 lb. per annum when full-scale production begins in 1961, giving Inco a total capacity of about 370,000,000 lb. of nickel per annum. This may be compared with total Free World consumption, which reached the record level of approximately 415,000,000 lb. in 1957.

Whether Inco will be able to restore its dividend cut this year is doubtful. Certainly, metal prices in general, and that of copper in particular, have been much firmer, and the company has had no labour troubles to contend with. Against this must be set the fact that capital spending this year will be at the record level of $65,000,000, mainly on the Manitoba project. As an investment, Inco's common shares are probably as near to being gilt-edged as a mining share can be. On the other hand, the present price, which is equivalent to about £32 10s., yields only 2.85 per cent. This would appear to discount Inco's progress for a long time to come.

LONDON MARKET HIGHLIGHTS

The previous week's strong rally in South African gold shares soon spent itself and on Monday the share market was again looking hesitant. Week-end news from Central Africa produced no fresh shocks but buyers were reluctant to operate and a dribble of sales from the Continent was sufficient to depress prices. About the only share to resist this rather dreary trend was West Wits which moved ahead to 55s. on buying orders from the Cape.

Apart from Platinum shares, which took another knock after their previous advance, the market began to improve on Tuesday, when an uncertain start, that was largely a result of further Continental sales, later gave way to firmer conditions. The Cape sent buying orders for selected O.F.S. issues, and Free State Geduld, for instance, recovered to 160s. after being only 158s. 9d. at one time.

The tendency continued on Wednesday when all African mining markets were looking in better shape thanks to an easing in tension surrounding the Central African situation. Kaffirs may have been additionally helped by the news that the Bank of Tokyo had bought another $30,000,000 (£10,714,300) of gold from the Federal Reserve System. This was the third purchase by Japan in recent months and made a total of $80,000,000 so far this year. Bank of Japan officials were quoted as saying that it was planned to buy more gold to build up the Bank's gold reserve against its currency issue. As usual, in such circumstances, there was market talk of a higher gold price.

London promptly started to buy F.S. Geduld which moved ahead to their best yet of 163s. 1½d. Western Holdings—still lagging behind—moved up to 137s. 6d. and "Ofsits" were 1s. 6d. up at 91s.

Copper shares were again little affected by the strength of the metal price. The rise here has been almost entirely due to a demand in the U.S. touched off by fears that the forthcoming renewal of the U.S. copper mineworkers' wage contract may mean a strike that will not easily be ended. Towards mid-week, however, Rhodesian issues could not ignore the sharp rise in both the metal and copper shares on Wall Street any longer and the market began to move ahead. U.S. buying of Roan (9s. 6d.) led the way and the rest followed. Messina issues had been consistently firm throughout, however, and when the awaited meeting disclosed that yet another property (the Alaska mine) was to be opened up, a further rise in prices was seen. Messina shares rose to 116s. 3d. and the options advanced to 71s. 3d.

A revival took place in Lead-Zinc issues as well. No particular reason for the improvement was put forward. But there seemed to be a feeling that although the outlook for lead and zinc still appeared obscure the time might be near for a recovery in the price of the metals. Consequently, Consolidated Zinc moved ahead to 61s. 6d. and the new shares that had made such an unpromising start were soon hoisted to 13s. 7½d. after having been down to 10s. 6d. in the previous week.

MESSINA TO BRING ALASKA TO PRODUCTION

After last week's announcement that Messina (Transvaal) and M.T.D. (Mangula) were to open a copper smelter at Alaska, it comes as no surprise to learn that Messina is planning to bring its Alaska copper prospect to production at about the same time as the smelter. Proposals to this end were announced by Cdr. Grenfell, Messina's chairman, at Wednesday's annual meeting.

The Alaska deposit is about 4 miles away from the proposed smelter site. The copper occurrence is comparatively small, containing only about 5,000,000 tons of ore at an average grade of 1.8 per cent copper, both sulphide and oxide. The tentative proposals are for an output of 500 tons daily, which would give the mine a life of some twenty-eight years.

The proximity of the mine to the new smelter will make it possible for the two companies to enjoy many services and facilities in common, and for this reason it is anticipated that the cost will be less than £500,000, all of which will be found from within Messina's own resources. It is probable that the Alaska operation, like that at Umkondo, will be retained as an integral part of the Messina company, and not hived off as was Mangula, which was, of course, a much larger and more expensive property. Mangula will benefit from the exploitation of Alaska by virtue of its share in the profits of the smelter and refinery.

Cdr. Grenfell also expanded on the progress of the Grenfell Park project.

This experiment is an example of the way in which even comparatively small groups like Messina can emulate more powerful mining interests in contributing to local prosperity without promise of immediate return. In Grenfell Park, the Messina group is experimenting with a great number of plant species of commercial value, which have been obtained from other parts of the world with climatic conditions similar to those at Messina. At the same time, efforts are being made to introduce modern methods of soil and water conservation into the district, and to raise the general productivity of local farms. The ultimate object is to establish secondary industries at Messina which will be based on locally grown products.

Cdr. Grenfell's statement is reported on page 320.

SAINTS GO MARCHING ON

One of the most popular counters in the Kaffir market over the past year or so has been St. Helena, Union Corporation's sole representative in the Orange Free State. Although the yield on the shares is low, buyers have never been hard to find, because it is certain that both tonnage and grade have still some distance to travel before maximum earnings are reached.

This spring's half-yearly dividend of 1s. 3d. marks a further step forward—it compares with 1s. 1d. in September and 1s. last March—but some optimists may have been disappointed that the increase was not more marked, in view of the trend of grade and earnings over the past few months. It must not be forgotten, however, that the Union Corporation group has a tradition of conservatism in these matters. There is certainly no reason to suspect that the September dividend will not show a further improvement, perhaps to 1s. 6d. or even 1s. 9d.

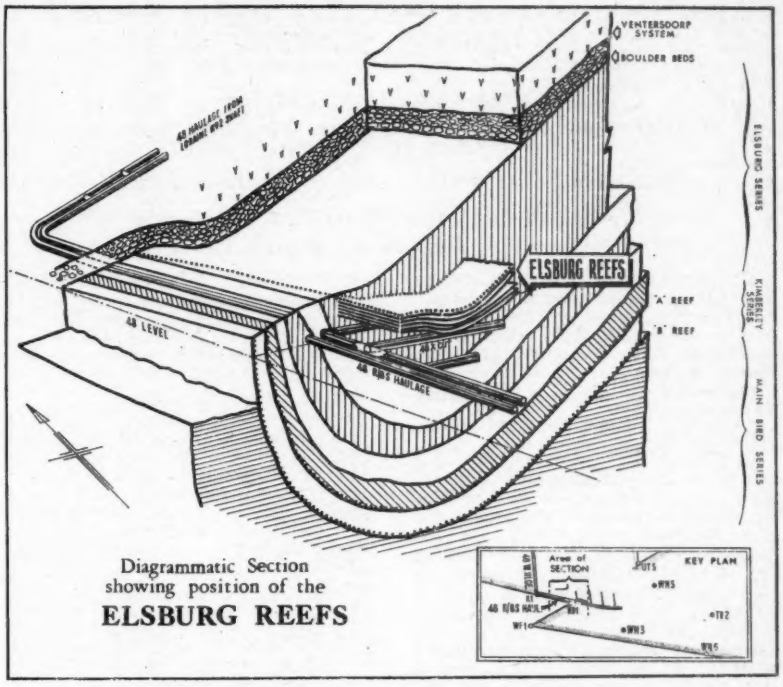
SEEKING THE RAINBOW'S END

At the rainbow's end, so we are told, lies a crock of gold. This, of course, hardly constitutes a probable, or even possible, ore reserve. The position in the Riebeeck section of the reorganized Loraine property, as revealed by the annual report released yesterday, is somewhat similar, but there is one important difference. Loraine's gold is to be found not at the end of the rainbow, but in the Rainbow Reefs, and the tonnage of ore in the crock depends on how far the Rainbow extends.

Although the eastern extremity of these unusual reefs has not yet been delimited, work done in the period ending on November 18 (the period covered by the engineers' report) has gone a long way towards achieving a fuller understanding of the nature of the Elsburg Reefs, as the Rainbow Reefs are properly called. The diagram above gives an indication of the extent of present knowledge.

The map can be regarded as a section across the northern extremity of the Riebeeck ground. Boreholes have indicated that the reef continues for a further 18,000 ft. to the south-east.

The formation is fairly typical of the O.F.S. fields. Below the Main-Bird series on the section lies the Basal Reef, the main O.F.S. gold carrier, which has been omitted for reasons of space. The unusual feature is the syncline, or trough, in which the Elsburg Reefs have been deposited.



Diagrammatic Section showing position of the **ELSBURG REEFS**

The western extremity of the reef occurrence is fairly well defined, because the overlaying Ventersdorp series cuts off the almost vertically rising Elsburg series. The speculative possibilities arise with regard to the possible eastern extensions of the reef, which would add a large quantity of ore to the already substantial tonnage reckoned to exist within the limits of the "trough". On the other hand, borehole results have indicated that values tend to fall away to the east.

From the diagram it can be seen that crosscuts have been driven below the reefs from the 48 level haulage. From these crosscuts it will have been possible to carry out a certain amount of reef development, the results of which should be announced in the next quarterly report, due in mid-April. Earlier boreholes have indicated that values should be high. With this in mind, Loraine shares could be a wise choice for capital appreciation in the short and medium terms.

THE FINANCIAL MAIL

An airmail edition of Vol. 1, No. 1, of the *Southern Africa Financial Mail* has reached us this week. The new paper, a fortnightly, covers both financial and commercial affairs in Southern Africa, as well as looking at world events through South African eyes.

Although the *Mail* is not specifically devoted to mining, a publication emanating from the Reef must be of interest to mining investors not only by virtue of its on-the-spot coverage and analysis of mining news, but also as a means of understanding the news behind the news. Such factors as the development of secondary industry and the trend of political thought in the Union are of prime importance to the Kaffir market, and it is this sort of information which the *Mail* will be able to provide.

Among the articles in the first edition of the *Mail* are "A yardstick for gold shares", which describes an original and somewhat unorthodox method of valuing gold shares.

The *Financial Mail* costs 2s. 6d. per copy plus air charges, and can be ordered from P.O. Box 9959, Johannesburg.

BULOLO GOLD DREDGING

Once a great gold producer, operations in New Guinea by Bulolo Gold Dredging have declined rapidly in past years. In the 1956 financial year, more than 11,300,000 cu. yds. were dredged at an average value of 12.82 c. per cu. yd. In the following year output had dropped to 8,210,700 cu. yds., although the value rose to 21.58 c. per yd. In the 1958 financial year, however, only 2,784,700 yds. were dredged, and the value was down as low as 14.04 c. per yd.

Originally, eight large bucket dredges were operating on the deposits, but the number has been gradually reduced until one dredge only is now working, production being supplemented by hydraulic sluicing. There are several years' life remaining before the auriferous ground is exhausted, but the company has met with no success in its exploratory activities in Papua and elsewhere. However, in 1954 timber milling in conjunction with the New Zealand Government began to make some contribution to profits.

Union Minière.—A note from the Union Minière du Haut Katanga says that both production and capital works in 1958 proceeded according to programme. Sales of copper kept pace with the tonnage produced, and the results justify forecasting a dividend equal to that distributed for 1957. The amount

(*Continued on page* 322)

THE MESSINA (TRANSVAAL) DEVELOPMENT COMPANY, LIMITED

(Incorporated in the Union of South Africa)

COPPER PRICE FLUCTUATIONS

OPTIMISM ENGENDERED BY STEADY PROGRESS TOWARDS HIGHER PRICE LEVELS

BETTER RESULTS ANTICIPATED FOR CURRENT YEAR

IMPORTANCE OF MINING OPERATIONAL DEVELOPMENTS

COMMANDER H. F. P. GRENFELL'S REVIEW OF ACTIVITIES

The Ninth Annual General Meeting of Stockholders of The Messina (Transvaal) Development Company, Limited, was held on March 18 in Johannesburg, **Commander H. F. P. Grenfell, D.S.C., R.N. (Ret'd.)** presiding.

The Chairman addressed the meeting as follows:

Ladies and Gentlemen,

It gives me great pleasure to welcome you to the Ninth Annual General Meeting of your Company, and, on behalf of the Board of Directors, to present for your approval their Report and the Audited Accounts of your Company for the financial year ended September 30, 1958. I propose with your approval to follow our usual practice and take them as read. (Agreed.)

This time last year, which was about half-way through the financial period with which we are dealing today, the price of copper was still under £180 per ton and the immediate future looked uncertain, to say the least. However, although this was not apparent at the time, the turning point had been reached and the recession in the United States, which had been the major cause of the collapse in prices during 1957, was already coming to an end. This, together with the effect of the cuts in production made earlier by several of the large producers, which only really began to become effective from March, 1958, onwards, brought about a gradual but none the less welcome improvement in price, and by the end of our financial year it had risen to £212.

Since then the market has been influenced by a number of factors which have caused severe fluctuations at times, some beneficial, some adverse. Among the more important of these factors were the decision by the Western European countries to remove the restrictions on trading in unwrought copper and other non-ferrous metals with countries behind the Iron Curtain: labour unrest resulting in prolonged strikes in Northern Rhodesia and Canada—and more recently—stoppages at plants in the U.S.A. and Chile; stock releases by the British Government; and finally, racial disturbances in Central Africa; broadly speaking, however, the picture is one of steady progress towards higher levels.

Confidence Sustained

The current quotation on the London Metal Exchange is approximately £257 15s. 0d. per ton, and our position is a good deal happier now than it was twelve months ago. Economic recovery seems to be well under way in the United States, there are definite signs of increasing trade between the Western and Eastern European *blocs*, and world stocks are relatively low. Taking all these, and other factors, into consideration, I cannot feel other than optimistic about the future.

As you know, I have always had faith in the long-term prospects for copper and therefore for your Company, and today I feel able once again to express my confidence in the near future, and to tell you that I have little doubt that our results for the current year will be considerably better than those now presented to you.

The Year's Results

From the brief résumé of events I have already given, you will have gathered that the price of copper fell sharply during the first half of our financial year until it reached its lowest level for eight years in February, 1958, and that thereafter there was a gradual and sustained improvement. This improvement was not sufficient, however, to compensate for the adverse effect on our profits of the low prices earlier in the year, and the final result was a net profit for the Group of £687,141—a decrease of about £473,000 as compared with the previous year, and £1,100,000 less than our record figure of two years ago.

Adding a profit of £14,682 resulting from the sale of investments, and the unappropriated balance of £33,608 brought forward from the previous year, the total available was £735,431. Out of this sum the payment of Dividends Nos. 16 and 17 absorbed £429,000, transfers of £225,000 and £23,306 were made to General and Capital Reserves respectively, and the balance of £58,125 has been carried forward to next year.

Operations at Messina

Turning now to operations at Messina, the most important feature to which I should refer is undoubtedly the decrease in operating costs, which fell by 3s. 8d. to 32s. 10d. per long ton of ore produced. The equivalent cost per long ton of recoverable copper was £120—on a short tonnage basis the corresponding figures are 29s. 4d. and £107.

Although it is true that just over half this saving was due to a reduction in the amount of development, diamond drilling, and other activities of a more general nature carried out during the year, the balance was achieved by increased operating efficiency.

For this very important contribution to our results in a most difficult year we have to thank Mr. Spence, our Resident Manager at Messina, the various Heads of Departments, and indeed all our employees who, once again, showed us that loyalty and co-operation which has been such a happy feature of our organization over the years.

However, although in the past year we succeeded, by close supervision and greater efficiency, in achieving the substantial reduction in working costs to which I have referred, I must point out, in fairness to the Management, that there are a number of factors entirely outside our control which continue to operate against us.

The cost of living shows no signs of falling and during the past few months there have been increases in the price of coal and in railway rates which have inevitably put up the cost of many items necessary for our operations. In these circumstances to reduce costs still further or even to hold them at their present level will be by no means easy, but we shall not relax our efforts and you can rely on us to do our best.

Another pleasing feature of last year's operations was a further increase in our Ore Reserves which now stand at just over five and a half million tons. This was achieved in spite of the fact that we deliberately reduced development as a temporary measure of economy.

You will see from the Summary of the General Manager's Report which accompanies the Accounts that there was a considerable improvement in general labour utilization in the past year, and also that the number of shifts lost per native due to sickness again showed a reduction. Both these factors contributed to the increased operating efficiency and consequent saving in costs to which I have already referred.

Once again it is a pleasure to be able to report to you—as on many previous occasions—that we continue to enjoy happy relations with all our employees, and that our labour supply, both European and African, remains satisfactory.

Grenfell Park Project

There is only one other matter concerning Messina with which I will deal briefly before reporting on our other properties, and that is Grenfell Park which has been referred to in some detail in the General Manager's Report.

Broadly speaking, this project has been initiated to explore the possibility of establishing at Messina secondary industries soundly based on products grown in the district.

To this end we are experimenting on ecological lines with a great number of selected plant species of commercial value obtained from other parts of the world where they have been grown successfully under similar climatic conditions to those experienced at Messina.

Additional and equally important objects of the scheme are to introduce the latest methods of soil and water conservation into the district, and to bring about a general improvement in the productivity of our farms.

Grenfell Park is a long-term project and for the next two or three years we shall still be mainly in the experimental stage. It is too early to make an assessment of the outcome, but we are very hopeful of success, and I have no doubt that if it does succeed it will prove to be of immense benefit to Messina and the surrounding district.

That concludes my report on affairs at Messina and I now turn to our properties and interests in Southern Rhodesia.

Umkondo

The first of these is Umkondo where, as you will have seen from the General Manager's Report, there has been an appreciable increase in Ore Reserves due to the disclosure, by development on the upper levels, of a larger tonnage of ore than was previously believed to exist. To mine this safely will entail the removal by opencast methods of a considerable quantity of waste overburden, and this work has already been put in hand.

As a result of these disclosures, production from the Mine will be stepped up, and mining operations arranged so as to combine output from these upper level ore bodies with that from the underground stopes. This will counteract the drop in grade experienced during the past year, and result in an extension to the profitable life of the Mine. We also

anticipate better recovery figures in the future as a result of the addition to the plant of another bank of flotation cells.

I am again glad to report a further substantial reduction in working costs, which fell by 13s. 3d. to 61s. 1d. per long ton of ore produced. This was a very creditable achievement on the part of our Resident Manager, Mr. Chandler, and his staff.

Unfortunately, due to the higher proportion of lower grade quartzites mined this year, there was a drop in the grade of ore produced, so that the actual cost per long ton of copper increased by £6 to approximately £112. This state of affairs, however, will be rectified as soon as the measures to which I have already referred have been put into effect.

Mangula

From Umkondo, I move on to Mangula to give you my report on that company's first year of production. The first Aerofall Mill was put into commission on September 17, 1957, and regular shipments of concentrates were made from October onwards. The average daily throughput was 1,370 short tons of ore from which were produced 10,700 short tons of concentrates containing 5,558 short tons of copper. This performance can be considered satisfactory for the first year of operations, when as always happens with new equipment, there are many teething troubles to overcome.

The operating cost per ton of ore treated was 27s. 8d., equivalent to £64 per short ton of concentrates. To this latter figure must be added realization charges amounting to £24 10s. per ton, which gives an overall cost figure of £88 10s. per ton of concentrates.

I think you will agree that the low level of prices on the copper market provided a severe test for a new mine just going into production, and the fact that Mangula with only half its milling capacity in commission was able to show a net profit of £3,740 for the year was, in my opinion, a very fine achievement.

The credit for this excellent result must go to the Resident Manager, Mr. Wilson, and his senior staff, but, as in the case of Messina, employees on the mine should also be included for their hard work and loyal support in a most difficult year.

The Second Aerofall Mill unit has now been installed, extensions to the flotation plant are complete, and as soon as the initial tests have been run, the Mine will work up to its planned production of 3,000 tons of ore per day. At the same time, the achievement of full production should result in a considerable decrease in working costs. I do not expect these to exceed 22s. per short ton of ore produced once the Mine has settled down on a routine production basis.

As regards Ore Reserves, you will have seen from the General Manager's Report that after allowing for the year's production there was an increase of about 1¼ million tons. This can be considered satisfactory as during the past year the management was compelled, for reasons of economy, to restrict underground development in the Molly Section and keep outside exploration at a minimum. These restrictions will gradually be relaxed as conditions permit, and further investigations of possible additional ore deposits within the exclusive prospecting area will be made.

Some promising indications have already been obtained by geochemical surveys in several parts of the property, and on one of them—in the Norah area—a small prospect shaft has been sunk and some development carried out underground.

At a depth of 150 feet two parallel ore bodies have been exposed, of which one, about 30 feet wide, averages 1.86 per cent copper over a strike length of 600 feet. Development is still incomplete and the area is faulted, but there are good reasons for hoping that further similar discoveries may be made over at least another 2,000 feet to the north. This area may therefore be described as promising.

New Smelting Plant in S. Rhodesia

Before leaving Mangula, there is another important matter with which I should deal, as it has a direct bearing on the fortunes of that Company. I refer to our decision, as already announced in the Press, to build a smelting and refining plant in Southern Rhodesia.

A new Company—The Messina Rhodesia Smelting and Refining Co. Ltd.—is to be formed with an initial capital of £750,000, of which £600,000 will be subscribed by ourselves, and the balance of £150,000 by Mangula. The plant will be situated on rail at Alaska, 45 miles by road from Mangula, and its main purpose will be to treat concentrates from this and any other mines we may bring into production in the territory. It will, however, also operate on a custom basis if required. The construction programme is already in hand, much of the equipment has arrived on the site, and the plant should be in operation within the next 18 months.

The erection of this new smelter will bring many advantages to Mangula. It will enable that Company to sell its output in the form of fire refined copper instead of concentrates, freight and other charges will be substantially reduced, and by arrangement with the Government of Southern Rhodesia Mangula will be exempt from the payment of royalty. Under an agreement with the new Company, Mangula will also be assured throughout its life of smelting and refining capacity for its output.

Alaska

I now turn to Alaska, which, as you may remember, is a copper prospect situated within about 4 miles of the proposed site for the smelter. The deposit consists of a number of sulphide and oxide ore bodies, which according to our present calculations contain approximately 5,000,000 tons of ore of an average grade of 1.8% copper. Our investigations are now complete and it is not anticipated that any difficulty will be experienced in mining the ore bodies, while metallurgical tests indicate that good recoveries of both sulphides and oxides may be expected.

We have therefore decided to bring the property into production on an initial scale of 500 long tons of ore per day. On this basis the life of the mine will be 28 years. The average annual output will amount to approximately 2,600 long tons of copper in the form of concentrates which will be sent for treatment to the new smelter.

In view of their proximity, arrangements will be made to provide a number of services and buildings, such as offices, stores, recreation club, etc. on a common basis for the Alaska Mine and the smelting company, and a substantial saving in capital expenditure will thus be possible. Taking this into account we estimate that it will not cost more than £500,000 to put Alaska into production, and your Directors propose that this sum shall be provided from the Company's resources. The preparation of the mine and the surface construction programme have been planned so as to bring the mine into production at approximately the same time as the smelter comes into operation — i.e. within the next 18 months. As in the case of Umkondo, I have no doubt that Alaska will prove to be a profitable undertaking and that it will make a valuable contribution to the revenues of your Company.

There is nothing of interest to tell you this year about our other prospects in Southern Rhodesia, all of which have been dealt with adequately in the General Manager's report, and this therefore brings me to the end of my review.

Tribute to Staff and Employees

It only remains for me to express on behalf of the Board and myself—and I am sure on your behalf also—our thanks to the General Manager, Mr. Frost, and to all our staff and employees, wherever they may be, for their continued loyalty and hard work throughout a difficult year.

The Directors' Report and Balance Sheet and Accounts for the year ended September 30, 1958, were adopted.

The retiring Director, Mr. D. E. Cox, was re-elected and the remuneration of the Auditors for the past year's audit was fixed.

There being no further business the Chairman declared the meeting at an end.

News and Results—*Continued*

to be proposed for confirmation by the annual meeting cannot be decided upon until the April board meeting.

Cape Asbestos—97 Per Cent Accept.—Acceptances of Cape Asbestos' recent rights offer of 2,000,000 shares at 12s. totalled more than 97 per cent.

Fanti Earns Less, Pays More.—In spite of a reduction in earnings from £174,673 in 1957 to £123,439 last year, Fanti Consolidated Investment is distributing 15 per cent by way of dividend and bonus, against 14 per cent in 1957. Meeting, March 24.

Aluminium Ltd.'s Earnings. — Unaudited net earnings of Aluminium Ltd. in 1958 amounted to $22,400,000 (74 c. per share) compared with $41,400,000 ($1.37 per share) in 1957. Sales of aluminium in all forms during the last quarter of the year totalled 142,000 tons against 154,000 tons for the corresponding quarter of 1957.

No More From Kundang.—In declaring a dividend of 3s. per share for the year ended December 31, 1958, Kundang Tin Dredging have said that it is not proposed to recommend any further payment in respect of that year. The 1958 total is, therefore, 6s., against 9s. in 1957.

Springbok Issue.—Of the 2,100,000 5s. shares offered by way of rights at par by Sprinkbok Colliery, applications have been received in respect of 99.75 per cent. Stock certificates will be posted on March 25.

Gold Fields May Bid for African Land.—Discussions are proceeding between New Consolidated Gold Fields and the African Land and Investment Co. with a view to an offer to African Land shareholders of 39s. per preference share and 44s. per ordinary share. Subject to the completion of the necessary formalities, it is anticipated that the formal offer will be made on or about March 23, and that the offer will be accompanied by a circular from the African Land directors commenting on the present position and future prospects of the company.

Tweefontein's Repayment.—The resolutions proposing the repayment of Tweefontein Colliery's preference shares at a premium of 3s. 6d. per share were carried at an E.G.M. held on Wednesday. Application will now be made to the Court for confirmation of the reduction.

Lampa Capitalization Issue. — The Lampa Mining Co., the Liverpool-based organization operating in Peru, proposes to make a one-for-three capitalization issue. The E.G.M. to consider the proposals will be held on April 1.

Yukon Consolidated.—Preliminary results from Yukon Consolidated Gold for 1958 indicate a taxed profit of $42,000, exclusive of government aid, which will probably add a further $135,000. Liquid assets at the end of the year, exclusive of government aid, amounted to approximately $2,190,000.

Seremban—A Little Better.—Seremban Ltd., whose revenue depends on tribute paid for the use of the company's Malayan tin leases, made a profit of £613 in the year to June 30 last, compared with £383, in the preceding twelve months. The adverse balance carried forward amounts to some £2,240, a reduction from £2,603. Meeting, April 8. Mr. W. E. Hosking is now chairman, in succession to the late Mr. D. W. Thomas.

LORAINE GOLD MINES, LIMITED

(Incorporated in the Union of South Africa)

FINANCE FOR FURTHER DEVELOPMENT

MR. B. L. BERNSTEIN'S REVIEW

The Annual General Meeting of Loraine Gold Mines, Limited, will be held on April 13 in Johannesburg.

The following is the statement by **Mr. B. L. Bernstein**, the chairman, which has been circulated with the directors' report:—

The technical and administrative control of your company was assumed by Anglo-Transvaal Consolidated Investment Company Limited from August 1, 1958, and I should like to express my appreciation to the Anglo American Corporation of South Africa Limited—the former administrators—for the close co-operation and helpful manner in which these changes were brought about.

The accounts under review and the technical advisers' report are concerned with the twelve-month period ended September 30, 1958. The technical advisers' report, however, includes information on progress at the Riebeeck property between the period July 1, 1957, to November 18, 1958, the date upon which the merger of your Company with Riebeeck Gold Mining Company Limited became effective.

Mining and development operations continue in the areas of No. 1 and No. 2 shafts of Loraine. Development footage accomplished during the year amounted to 52,486 feet, being 31,728 feet less than in the previous year. Development on Basal Reef decreased by 14,005 feet and, by confining development on the Basal Reef to a known payable area, will be decreased still further during the present financial year. Development on the "B" Reef decreased by 7,452 feet and is now confined to the area down dip at No. 2 shaft in a likely pay zone.

Footage sampled, at 17,925 feet, was just over half that sampled in the previous year. Payability declined to 24.6 per cent, but the average value of the payable footage increased by 55 inch-dwt. and 0.49 inch-lb. to 439 inch-dwt. and 19.43 inch-lb. respectively.

Despite the low payability of development, the ore reserve showed a small increase of 1,500 tons. The value of the ore reserve increased by 0.39 dwt. per ton of gold and 0.068 lb. per ton of uranium oxide. The estimated stoping width has been reduced by 3.18 inches to 41.3 inches.

Reef Development

We are now obtaining the first results of reef development in the northern extremity of the former Riebeeck lease area. The extent of this development up to December 31, 1958, is shown on the plan of the underground workings. On the 48th level twin haulage, ventilation facilities have been increased and substantial progress has been made in advancing crosscuts eastwards to the Elsburg reefs. A twin haulage on the 52nd level is being driven westwards and it is anticipated that connections to the 48th level will be made towards the end of this year. Since the close of the financial year and up to December 31, 1958, 260 feet of reef development have been accomplished on these reefs. Of this footage 220 feet, or 84.6 per cent, proved payable at a gold value of 521 inch-dwt. and a uranium oxide content of 5.62 inch-lb. These reef exposures are in a conglomerate band stratigraphically below the bands referred to as the Rainbow Reef.

In order to present a clearer picture of the geological structure, there has been annexed to the directors' report and accounts a diagrammatic transverse section through the property.

This diagrammatic section shows that the strata conform to the general pattern of the Orange Free State goldfield and dip westwards until they approach the western extremity where the measures below the Ventersdorp System have been folded to form a syncline (or trough). Along the western limb of this trough there has been considerable steepening, particularly near the sub-outcrop against the Ventersdorp System.

Sinking of Riebeeck No. 1 shaft, which has been renamed No. 3 shaft, is continuing, and on January 31, 1959, the shaft had reached a depth of 3,129 feet below the collar.

Finance

It is estimated that the funds of the company, including the additional £1m. loan from Anglo American Corporation of South Africa, Limited, in terms of the merger agreement, will be exhausted by the middle of 1959 and, in terms of a circular issued on February 3, 1959, 3,072,669 shares will be offered to shareholders at a price of 20s. per share. The capital to be raised by the issue is required by the company to complete the sinking of the shaft on the former Riebeeck Gold Mine, to carry out further development and to bring the Riebeeck section of the mine to production.

I desire to place on record your board's appreciation of the services rendered by the former mine manager, Mr. A. Tennent, who was succeeded by Mr. A. R. Louw on the merger taking place, the mine staff and employees and the staffs at both the head office and the London office of the company.